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highlights

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Currently the scientific community is trying to increase the general population's knowledge of science. These efforts stem from the fact that the citizenry needs a better understanding of scientific knowledge to make informed decisions on many issues of current concern. The problem of scientific illiteracy begins in grade school and can be traced to inadequate exposure to science and scientific thinking during the preparation of K–8 teachers. Typically preservice elementary teachers are required to take only one or two disconnected science courses to obtain their teaching certificates. Also, introductory science courses are often large and impersonal, with the result that while students pass the courses, they may learn very little and retain even less.

In an effort to improve teacher preparation, a group of faculty from four separate disciplines—chemistry, geology, biology, and physics—worked together to develop an integrated science course tailored for elementary education majors. This four-credit course offered through the university's Interdisciplinary Studies Division fulfills part of the elementary education student's science requirements. The participating faculty receive released time from their individual departments for their involvement in the development and implementation of the course. The course is offered during both the fall and spring semesters. Currently, the university is seeking to develop a university-wide integrated science course using the elementary education course as a model.

A thematic approach was selected to teach the course. Three topics were chosen based upon the research expertise of the faculty, issues of regional concern, and subjects that required an understanding of several different disciplines: health effects of mineral dusts, water in the environment, and energy flow in systems. For each topic Web pages were created and lecture notes placed on them as they were developed. Class and laboratory activities and demonstrations were developed or incorporated from existing resources. The activities range from dissecting pig hearts and lungs to water testing and building models of atoms. The major goal of the course was for students to learn the importance of a well-rounded scientific education and how that can be used to question and solve societal problems independent of any one scientific discipline. This was achieved by breaking down the barriers between the scientific disciplines and integrating the many aspects of science.

Now in the fifth semester of offering the class, we have to turn students away owing to full enrollment. The course, with a class size of approximately 30 students, meets for three hours twice a week. With this extended meeting time, we are able to model different teaching methods, including a mix of lectures, hands-on activities in a cooperative learning environment, demonstrations, and peer learning/teaching. Several field trips are taken, including trips to the local waste water treatment plant, the university's power plant, and surface and ground water research sites. Thus, the students experience several strategies for teaching science while gaining scientific knowledge. The faculty and teaching assistants meet weekly to carefully choreograph each three-hour period.

The students make extensive use of email and the Web. (Refer to *http://www.uidaho.edu/~mgunter* for details of the course including syllabi and handouts.) One innovative use of email, which we have found to be particular good for our preservice teachers, involves students from grades K–8 throughout the state. The K–8 students submit questions to our students, giving the integrated science students experience at both using email and answering the types of questions they will encounter when they begin teaching.

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